

III. REMARKS

Claims 1, 4, 22, and 37 have been amended to further define the invention. Support for the amendments can be found, for example, at page 2 lines 10-12, page 2 line 28 to page 3 line 6, and page 18 lines 3-6 of the specification. Claims 5 and 14 have been amended to provide adequate coverage for the invention. Support for these amendments can be found, for example, at page 5 lines 20-26 of the specification. Claims 29-33, 35, 36, and 40-44 have been canceled. Claims 1-28, 34, 37-39, 45 and 46 are pending.

Interview Summary

Applicants thank Examiner Peter A. Szekely for the courtesies extended to the undersigned attorney during a telephone interview on July 28, 2006. During the interview, there was a discussion of the invention and the rejection of the claims 1-28, 37-39 and 44-46 under 35 U.S.C. 112, first paragraph.

It was agreed that claims 1-28, 37-39 and 44-46 would be amended to define "liquid plastisol/hot melt hybrid" compositions, and that such amendment would overcome the rejection of these claims under 35 U.S.C. 112, first paragraph set forth in the Office Action dated May 1, 2006. By this amendment, the claims have been modified as agreed.

Restriction Requirement

The Examiner required restriction under 35 USC §121 between Group I, claims 1-28, 34-35, 37-39 and 44-46, drawn to a composition; Group II, claims 29, 32, 33 and 36, drawn to a laminate; and Group III, claims 30-31 and 40-43, drawn to a process of blending.

During a telephone conversation with applicant's undersigned attorney on 4/26/06 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-28, 34-35 and 37-39. Affirmation of this election has been required of applicants in replying to this Office action. Claims 29-33, 36 and 40-43 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicants hereby affirm the election to prosecute the invention of group I, claims 1-28, 34-35 and 37-39.

Applicants have made the above election of species to comply with 35 U.S.C. 121 for the sole purpose of prosecution on the merits. Applicants' election should not be construed in any way to limit the scope or spirit of any of the embodiments of the present invention disclosed in the application.

Specification Objections

The disclosure has been objected to because of the following informalities: On page 7, lines 17-18, PVB and PVF are identified as being copolymers of PVOH. The Examiner takes the position that this is incorrect, and has required correction.

While Applicant's do not find the original sentence to have been inaccurate, Applicants have amended that paragraph to clarify the noted sentence to read: "The reinforcing phase could also be comprised of higher polarity polymers such as polyvinyl alcohol, polyvinyl alcohol copolymers, polyvinylbutyral, polyvinylformal, ethylene vinyl alcohol, polyamides (nylons), and polyvinylpyrrolidone copolymers." It is thus respectfully requested that the Examiner's objection be withdrawn.

Claim Objections

Claim 44 has been objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim, the Examiner taking the position that the intended use does not further limit the composition.

Applicants have canceled claim 44, rendering the objection moot.

§ 112 Rejections

1. Claims 1-28, 37-39 and 44-46 have been rejected under 35 U.S.C. 112, first paragraph, the Examiner asserting that the specification, while being enabling for a hot melt adhesive, does not reasonably provide enablement for other kind of adhesives and dispersions.

In accordance with the agreement reached during the noted interview, applicants have amended claims 1-28, 39 and 44 to define a "multiple component liquid plastisol/hot melt hybrid adhesive composition" and claims 37, 38, 45 and 46 to define a "liquid plastisol/hot melt hybrid multiple component composition." It is such a liquid plastisol/hot melt hybrid composition that

is described throughout the specification, in contrast to conventional hot melt adhesive compositions.

It is submitted that claims 1-28, 37-39 and 44-46 comply fully with 35 U.S.C. 112, first paragraph, and withdrawal of these rejections is requested.

2. Claim 4 has been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner has objected specifically to the term “resistant” in claim 4 as a relative term which renders the claim indefinite.

Claim 4 has been amended to utilize the definite term “insoluble” in place of the less definite term “resistant.” Claim 4 as amended fully complies with 35 U.S.C. 112, second paragraph and the rejection should be withdrawn.

§ 102/103 Rejections

Claims 1-10, 12, 14-28, 34-35, 37-39 and 44-46 are rejected under 35 U.S.C. 102(b or e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Flanagan et al. 3,644,245, Yazaki et al. 4,548,985, Wang et al. 6,143,818, Peacock 5,574,084, Kolb et al. 6,586,483, Butterbach et al. 6,677,394 or Chheang et al. 2003/0100654.

With regard to the specific references, the Examiner has stated as follows:

- Flanagan et al. disclose a hot melt adhesive (HMA) containing EVA, glycerol ester of hydrogenated rosin, mineral oil and paraffin in claim 5. The EVA contains 4-16 moles of ethylene per mole of vinyl acetate (claim 1).

- Yazaki et al. teach an HMA containing an anhydride-modified olefin mixed with an unmodified olefin and epoxidized oils in claim 1. The anhydride is maleic anhydride (claim 3). The modified olefin is a blend of EVA and polypropylene or polyethylene (claim 4). Epoxidized oils are listed in claim 6. The unmodified olefin is polyethylene or polypropylene (See the Examples).

- Wang et al. divulge an HMA containing ethylene-propylene copolymer, olefin polymer, tackifier, plasticizer, wax and stabilizer in claim 1, polyterpenes in claim 2, mineral oil in claim 3, EVA in claim 11 and polyolefin waxes in claim 12.

- Peacock reveals an HMA containing EVA, tackifier and modifier in claim 1, dicarboxylic acids, among them dodecanoic acid, as the modifiers in claim 8, terpenes and rosin esters in column 2, lines 22-37 and plasticizers in column 3, lines 35-38.

- Kolb et al. display a foam comprising a vehicle and surface-modified nanoparticles in claim 1, identifies the vehicle as a blend of EVA and ethylene-propylene copolymer in claim 21, a blend of polyvinyl butyral and EVA in claim 23, which vehicle is a hot melt adhesive (claim 42). The nanoparticles are modified by octanoic or dodecanoic acid (column 6, line 65-67). For water and organic liquids see column 8, lines 64-67, for plasticizers see column 10, line 23. Foaming agents are listed from column 11 line 60 to column 12, line 65.

- Butterbach et al. describe an HMA containing pentaerythritol ester of abietic acid (rosin), EVA, hindered phenol, polyethylene glycol and ethylene bis-stearamide in column 5, lines 1-10.

- Chheang et al. discuss an HMA containing polymer and not exfoliated organophilic clay in claim 1, exfoliated clay in claim 2, tackifier in claim 9, smectite in claim 10, blends of EAA or EVA with polyethylene or ethylene-propylene copolymers in paragraph 0031, reactive monomers, tackifiers and plasticizers in paragraph 0032, terpenes in paragraph 0046, particle sizes of the clay in paragraph 0071 and tackifiers and plasticizers again in paragraph 0073.

The Examiner concludes that applicants' claims are not novel. In the alternative, it is asserted that it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to select applicants' ingredients from a list of equivalents.

Applicants respectfully traverse the rejections of claims 1-10, 12, 14-28, 34-35, 37-39 and 44-46 under §102 or, in the alternative, §103. According to the MPEP, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." See MPEP 2131 (quoting *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631) (emphasis added). Furthermore, "[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references

when combined) must teach or suggest all the claim limitations." See MPEP 2143 (emphasis added).

Claim 1 defines a multiple component liquid plastisol/hot melt hybrid adhesive composition comprised of a polymeric reinforcing phase component and an adsorbent phase component, both as heterogeneously dispersed particulates within a liquid component, wherein the reinforcing phase component is substantially incompatible with the liquid component, the adsorbent phase component is compatible or substantially more compatible with the liquid component than is the reinforcing phase component, and the reinforcing phase and adsorbent phase components are partially compatible with one another, the composition having the rheological characteristics of a liquid dispersion at room temperature and being capable of forming a molten blend at elevated temperatures that solidifies into a solid adhesive upon cooling.

In direct contrast to the liquid plastisol/hot melt hybrids defined in claim 1, and as acknowledged by the Examiner in the Office Action, each and every one of the cited references describes various compositions which are strictly "hot melt adhesives." As noted in the specification at page 1 lines 19-21, "[h]ot-melt adhesives are adhesives which are solid at room temperature and which are applied to the substrates to be joined in the form of a melt, solidifying on cooling after the substrates have been joined together." Similar definitions of hot melt adhesives can be found in the cited references, for example at column 1 lines 16-20 of Flanagan ("A hot melt is a thermoplastic material which is in the form of a 100 percent, by weight, solid. Application of heat melts the solid hot melt and brings it to the liquid state and, after removal of heat, it sets by simple cooling.") Applicants also attach hereto the definition from page 23 from *Hawley's Condensed Chemical Dictionary*, 13th Ed., 1997, John Wiley & Sons, Inc., which defines an "adhesive, hot-melt" as a "solid, thermoplastic material that melts quickly upon heating, and then sets to a firm bond on cooling."

The "plasticizer" percentage was limited in each of the cited patents, and was always below the level that would be required to achieve a plastisol. Of course, this was the intent in the case of each reference as the inventors were all preparing solid compositions. Thus, at least the claim 1 limitation for a "composition having the rheological characteristics of a liquid dispersion at room temperature" is not suggested in any of the cited references. As a result, claim 1 is not

anticipated by any of the cited references, and the references, taken alone or in combination, fail to establish a prima facie case of obviousness with regard to claim 1.

Furthermore, there is nothing in any of the references to teach or suggest a “composition comprised of a polymeric reinforcing phase component and an adsorbent phase component, both as heterogeneously dispersed particulates within a liquid component, wherein the reinforcing phase component is substantially incompatible with the liquid component, the adsorbent phase component is compatible or substantially more compatible with the liquid component than is the reinforcing phase component, and the reinforcing phase and adsorbent phase components are partially compatible with one another.” The Examiner asserts that it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to select applicants’ ingredients from a list of equivalents.

Although many of the applicants’ preferred ingredients could be ascertained by means of a combinatorial reading of the references, excessive experimentation would be required to “land-on” a viable hybrid plastisol/hot-melt composition as defined. “A rejection cannot be predicated on the mere identification in [the reference] of individual components of claimed limitations. Rather, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.” *In re Kotzab*, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). A prior art suggestion for virtually endless experimentation is not a case of prima facie obviousness. *In re Dow Chemical Co.*, 5 USPQ 2d 1529, 1532 (Fed. Cir. 1989). In view of the cited references, it is at best obvious to try to the specific compositions discovered and claimed by the applicants from the many possible combinations outlined therein. This is not the standard of 35 USC §103. *In re Geiger*, 2 USPQ 2d 1276, 1278 (Fed. Cir. 1987).

As with claim 1, independent claims 22 and 37 define a liquid plastisol/hot melt hybrid composition that has the rheological characteristics of a liquid dispersion at room temperature. Accordingly, these claims, along with each of the claims dependent from claims 1, 22, or 37, are also patentable over the cited references.

Unlike the remaining claims, independent claim 34 defines a “hot-melt adhesive” rather than a liquid plastisol/hot melt hybrid composition, but further defines the composition as comprised of *at least partially exfoliated nanoparticles*.

As noted by the Examiner, Kolb describes a foam comprising a vehicle (which may be a hot melt adhesive) and surface-modified nanoparticles. At column 4 lines 12-15, Kolb indicates that “[t]he term ‘surface-modified nanoparticle’ refers to a particle that includes surface groups attached to the surface of the particle (emphasis added).” Kolb thus fails to suggest the use of “exfoliated” nanoparticles, and the invention defined by claim 34 is therefore patentable over Kolb.

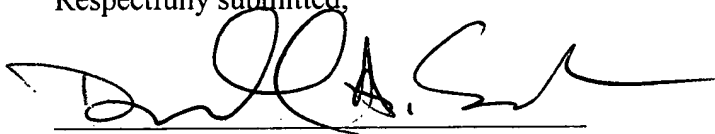
Conclusion

For all of these reasons, the rejections of claims 1-10, 12, 14-28, 34-35, 37-39 and 44-46 have been overcome and should be withdrawn.

In view of the above discussion and amendments, all of the claims of record define patentable subject matter over the art of record. Therefore, the application is in condition for allowance, and an early Notice of Allowance is respectfully requested.

Should the Examiner wish to modify any of the language of the claims, applicant’s attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,



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sure-sensitive); gums, terpene resins (rosin), mucilages

(c) Mineral: asphalt, pitches, hydrocarbon resins

2. Synthetic

(a) Elastomer-solvent cements

(b) Polysulfide sealants

(c) Thermoplastic resins (for hot-melts): polyethylene, isobutylene, polyamides, polyvinyl acetate

(d) Thermosetting resins: epoxy, phenoformaldehyde, polyvinyl butyral, cyanoacrylates

(e) Silicone polymers and cements

For further information, refer to Case Western Reserve University in Cleveland, Ohio, which maintains a fundamental research center for adhesives and coatings.

adhesive, high-temperature. (1) An organic polymer, e.g., polybenzimidazoles, that retains bonding strength up to 260C for a relatively long time (500–1000 hours); strength drops rapidly above 260C, 80% being lost after 10 minutes at 535C. (2) An inorganic (ceramic), e.g., silica-boric acid mixtures or cermets produce bonds having high strength above 2000F. Adhesive lap-bond strengths can be over 2000 psi at 1000F. These adhesives are used largely for aerospace service, and for metal-metal and glass-metal seals. A silicone cement is reported to have been used to adhere tiles to spacecraft.

See RTV.

adhesive, hot-melt. A solid, thermoplastic material that melts quickly upon heating, and then sets to a firm bond on cooling. Most other types of adhesives set by evaporation of solvent. Hot-melt types offer the possibility of almost instantaneous bonding, making them well suited to automated operation. In general, they are low-cost, low-strength products, but are entirely adequate for bonding cellulosic materials. Ingredients of hot-melts are polyethylene, polyvinyl acetate, polyamides, hydrocarbon resins, as well as natural asphalts, bitumens, resinous materials, and waxes.

Use: Rapid and efficient bonding of low-strength materials, e.g., bookbinding, food cartons, side-seaming of cans, miscellaneous packaging applications.

See sealant.

adhesive, rubber-based. (cement, rubber). (1)

A solution of natural or synthetic rubber in a suitable organic solvent, without sulfur or other curing agent; (2) a mixture of rubber (often reclaimed), filler, and tackifier (pine tar, liquid asphalt) applied to fabric backing (pressure-sensitive friction tape); (3) a room-temperature curing rubber-solvent-curable mixture, often made up in two parts that are blended just before use; (4) rubber latex, especially for on-the-job repairing of such items as conveyor

belts; (5) silicone rubber cement (see RTV and silicone).

Hazard: Those containing organic solvents, (1) and (3) above, are flammable.

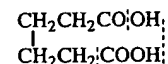
adhesive working life. (pot life).

The length of time an adhesive is usable after being mixed.

adiabatic. Descriptive of a system or process in which no gain or loss of heat is allowed to occur.

adipic acid. (hexanedioic acid; 1,4-butanedicarboxylic acid).

COOH(CH₂)₄COOH. 48th highest-volume chemical produced in U.S. (1995).



Properties: White, crystalline solid. Mp 152C, bp 265C (100 mm), d 1.360 (20/4C), flash p 385F (196C) (CC). Slightly soluble in water; soluble in alcohol and acetone. Relatively stable. Combustible.

Derivation: Oxidation of cyclohexane, cyclohexanol, or cyclohexanone with air or nitric acid.

Grade: Technical; FCC.

Use: Manufacture of nylon and of polyurethane foams; preparation of esters for use as plasticizers and lubricants; food additive (acidulant); baking powders; adhesives.

adipocere. The grease material formed when animal fats decompose.

"Adipol" [FMC]. TM for a series of adipate plasticizers.

adiponitrile. (1,4-dicyanobutane). NC(CH₂)₄CN.

Properties: Water-white, odorless liquid. Mp 1–3C, refr index 1.4369 (20C), bp 295C, flash p 200F (93.3C) (OC). Slightly soluble in water; soluble in alcohol and chloroform. Combustible.

Derivation: Chlorination of butadiene to dichlorobutylene, which is reacted with 35% sodium cyanide soluble to yield 1,4-dicyanobutylene, which is hydrogenated to adiponitrile. Also by electroorganic synthesis from acrylonitrile.

Hazard: Toxic by ingestion and inhalation.

Use: Intermediate in the manufacture of nylon; organic synthesis.

"Adiprene" [Du Pont]. TM for a polyurethane rubber, the reaction product of diisocyanate and polyalkylene ether glycol. In its raw polymer form, it is a liquid of honey-like color and consistency, which is compounded chemically (to polymerize it further) and converted into products by casting and other techniques.

See polyurethane.

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